

10/791,295
PTGF-03109
HIR.092

RECEIVED
CENTRAL FAX CENTER
MAY 07 2009

AMENDMENTS TO THE CLAIMS:

Please cancel claims 7-10 and 52 without prejudice or disclaimer.

1- 45. (Canceled)

46. (Currently amended) A light-emitting apparatus, comprising:

a semiconductor light-emitting element that emits light with a predetermined wavelength; and

an external lens having a light convergence shape to converge light emitted from the semiconductor light-emitting element, said external lens comprising:

a recess to house the semiconductor light-emitting element, said recess including an upper surface formed over said light-emitting element and a side surface which is substantially perpendicular to said upper surface; and

a phosphor layer portion that has a substantially uniform thickness and is conformally formed on said upper and side surfaces a surface of the recess such that an inner surface of the phosphor layer portion has a shape which substantially conforms to a shape of said upper and side surfaces of said recess, the phosphor layer portion including a phosphor to be excited by irradiating light emitted from the semiconductor light-emitting element,

wherein the upper and side surfaces of the recess are is closely disposed surrounding the light-emitting element such that the light convergence shape converges light radiated from the phosphor layer portion into a spot of light; and

~~wherein in a horizontal cross section, the recess comprises a maximum inside dimension nearly equal to a diagonal dimension of the semiconductor light-emitting element while housing the semiconductor light-emitting element.~~

47. (Previously presented) The light-emitting apparatus according to claim 46, wherein the semiconductor light-emitting element comprises a flip-chip type light-emitting diode (LED) element that emits light from its light emission surface located on the opposite side of its mounting surface.

10/791,295
PTGF-03109
HIR.092

48. (Previously presented) The light-emitting apparatus according to claim 46, wherein the recess is located close to the semiconductor light-emitting element along the profile of the semiconductor light-emitting element.
49. (Previously presented) The light-emitting apparatus according to claim 46, wherein the semiconductor light-emitting element comprises a plurality of light-emitting diode (LED) elements which are disposed in a predetermined arrangement.
50. (Previously presented) The light-emitting apparatus according to claim 46, wherein the semiconductor light-emitting element comprises a plurality of light-emitting diode (LED) elements which have different emission wavelengths and are disposed in a predetermined arrangement.
51. (Previously presented) The light-emitting apparatus according to claim 46, wherein the phosphor layer portion is formed on an entire surface of the recess.
52. (Canceled)
53. (Previously presented) The light-emitting apparatus according to claim 46, wherein a horizontal cross section of the recess comprises one of a circular shape and a rectangular shape.
54. (Previously presented) The light-emitting apparatus according to claim 46, further comprising:
an electrode, said light-emitting element being formed on said electrode, and said external lens being affixed to said electrode by a sealant formed on said light-emitting element.
55. (Previously presented) The light-emitting apparatus according to claim 54, wherein

10/791,295
PTGF-03109
HIR.092

said external lens comprises:

a convex portion and a bottom surface which is formed opposite the convex portion and includes said recess.

56. (Previously presented) The light-emitting apparatus according to claim 55, further comprising:

a submount formed on a concave portion of said electrode, a wiring pattern being formed on a surface of said submount and said light-emitting element being mounted on said wiring pattern.

57. (Previously presented) The light-emitting apparatus according to claim 56, wherein said electrode comprises a plurality of leads, and said submount is formed on said plurality of leads.

58. (Currently amended) The light-emitting apparatus according to claim 57, wherein a gap is formed between said inner a surface of said phosphor layer portion and said light-emitting element, said sealant filling said gap.

59. (Currently amended) The light-emitting apparatus according to claim 46, wherein said semiconductor light-emitting element is mounted on an electrode and said external lens is mounted on said electrode, and

wherein the recess includes a rectangular-shaped horizontal cross-section and said upper surface comprises a planar surface which is formed opposite a light-emitting surface of said light-emitting element, such that the recess is closely disposed surrounding the light-emitting element and the light convergence shape converges light radiated from the phosphor layer portion into a spot of light.

60. (Previously presented) The light-emitting apparatus according to claim 59, wherein light emitted from said light-emitting surface is incident on said light convergence shape of said lens via said planar surface of said recess.

10/791,295
PTGF-03109
HIR.092

61. (Currently amended) A light-emitting apparatus, comprising:
- an electrode formed on a surface of one of a lead and a wiring board;
 - a semiconductor light-emitting element that has a rectangular-shaped horizontal cross-section and is flip-chip mounted on said electrode and emits light with a predetermined wavelength; and
 - an injection-molded external lens comprising:
 - a planar surface which is mounted onto a planar surface of said electrode over said light-emitting element;
 - a light convergence shape formed on a side of said external lens which is opposite the planar surface, for converging light emitted from the light-emitting element;
 - a recess formed in said planar surface of said lens and forming an upper portion of a housing for the semiconductor light-emitting element, said planar surface of said electrode forming a lower portion of said housing, said recess including an upper surface formed over said light-emitting element and a side surface which is substantially perpendicular to said upper surface; and
 - a phosphor layer portion that has a substantially uniform thickness and is conformally formed over said upper and side surfaces ~~an entire surface~~ of the recess such that an inner surface of said phosphor layer portion and has a uniform thickness has a shape which substantially conforms to a shape of said upper and side surfaces of said recess, the phosphor layer portion including a phosphor to be excited by irradiating light emitted from the semiconductor light-emitting element; and
 - a sealing resin formed in said recess between said light-emitting element and said phosphor layer portion, which seals said light-emitting element and bonds said external lens to said electrode;
- ~~wherein in a horizontal cross section, the recess comprises a maximum inside dimension nearly equal to a diagonal dimension of the semiconductor light-emitting element while housing the semiconductor light-emitting element.~~

62. (New) A light-emitting apparatus, comprising:

10/791,295
PTGF-03109
HIR.092

a semiconductor light-emitting element that emits light with a predetermined wavelength; and

an external lens mounted over said semiconductor light-emitting element and having a light convergence shape to converge light emitted from the semiconductor light-emitting element, a recess being formed in said external lens to house the semiconductor light-emitting element, said recess including an upper surface formed over said semiconductor light-emitting element and a side surface which is substantially perpendicular to said upper surface; and

a phosphor coating having a substantially uniform thickness and being conformally formed on said upper and side surfaces of the recess such that an inner surface of said phosphor coating has a shape which substantially conforms to a shape of said upper and side surfaces of said recess, said phosphor coating comprising a phosphor to be excited by irradiating light emitted from the semiconductor light-emitting element,

wherein the inner surface of said phosphor coating is closely disposed surrounding the light-emitting element such that the light convergence shape converges light radiated from the phosphor layer portion into a spot of light.

63. (New) The light-emitting apparatus according to claim 62, wherein said external lens comprises an injection-molded lens.

64. (New) The light-emitting apparatus according to claim 63, further comprising:

a lead, said external lens being mounted on said lead,

wherein said external lens comprises a positioning member for positioning said external lens on said lead over said semiconductor light-emitting element.

65. (New) The light-emitting apparatus according to claim 64, wherein said positioning member comprises a convex portion which is engaged with a concave portion of said lead.